B. TECH.

COMPUTER SCIENCE & ENGINEERING

Third & Fourth Semester

EVALUATION SCHEME & SYLLABUS

Effective from session (2018-19)

FACULTY OF ENGINEERING
UNIVERSITY OF LUCKNOW
LUCKNOW

UNIVERSITY OF LUCKNOW

FACULTY OF ENGINEERING

Evaluation Scheme for B. Tech.

(Effective from session 2018-19)

Branch: Computer Science & Engineering

SEMESTER - III

S. No.	Subject Code	Subject Name	L-T-P	Evaluation					Credit
				Sessional			ESE	Grand Total	
				CT	TA	Total			
	Theory								
1.	AS - 301	Mathematics - III	**3--1--0**	**20**	**10**	**30**	**70**	**100**	**4**
2.	EE - 301	Network Analysis & Synthesis	**3--1--0**	**20**	**10**	**30**	**70**	**100**	4
3.	CS - 301	Data Structure Primer using C	**3--0--0**	**20**	**10**	**30**	**70**	**100**	**3**
4.	CS - 302	Numerical & Statistical Techniques in Computer Science	**3--0--0**	**20**	**10**	**30**	**70**	**100**	**3**
5.	EC - 301	Digital Circuits & Logic Design	**3--0--0**	**20**	**10**	**30**	**70**	**100**	3
6.	AS – 302/ AS - 303	Human Values & Ethics / Environment & Ecology	**3—0--0**	**20**	**10**	**30**	**70**	**100**	**3**
	Practical								
7.	EE - 351	Network Analysis & Synthesis Lab	**0--0--2**	**-**	**20**	**20**	**30**	**50**	**1**
8.	CS - 351	Data Structure Lab	**0--0--2**	**-**	**20**	**20**	**30**	**50**	**1**
9.	CS - 352	Numerical Technique Lab	**0--0--2**	**-**	**20**	**20**	**30**	**50**	**1**
10.	EC - 351	Digital Circuits & Logic Design Lab	**0--0--2**	**-**	**20**	**20**	**30**	**50**	**1**
11.	**GP - 301**	**General Proficiency**				**50**		**50**	
Total			**18-2-8**					**800**	**24**

UNIVERSITY OF LUCKNOW

FACULTY OF ENGINEERING

Evaluation Scheme for B. Tech.

(Effective from session 2018-19)

Branch: Computer Science & Engineering

SEMESTER - IV

S. No.	Subject Code	Subject Name	L-T-P	Evaluation					Credit
				Sessional			ESE	Grand Total	
				CT	TA	Total			
	Theory								
1.	AS - 404	Discrete Mathematical Structure	**3--1--0**	**20**	**10**	**30**	**70**	**100**	**4**
2.	CS - 401	Computer Organization	**3--1--0**	**20**	**10**	**30**	**70**	**100**	**4**
3.	CS - 402	Theory of Automata	**3--0--0**	**20**	**10**	**30**	**70**	**100**	**3**
4.	CS - 403	Object Oriented Programming	**3--0--0**	**20**	**10**	**30**	**70**	**100**	**3**
5.	EC - 403	Fundamentals of Microprocessor	**3--0--0**	**20**	**10**	**30**	**70**	**100**	**3**
6.	AS – 402/ AS - 403	Human Values & Ethics/ Environment & Ecology	**3—0--0**	**20**	**10**	**30**	**70**	**100**	**3**
	Practical								
7.	CS - 451	Computer Organization Lab	**0--0--2**	**-**	**20**	**20**	**30**	**50**	**1**
8.	CS - 452	Automata Lab	**0--0--2**	**-**	**20**	**20**	**30**	**50**	**1**
9.	CS - 453	Object Oriented Programming / Java Lab	**0--0--2**	**-**	**20**	**20**	**30**	**50**	**1**
10.	EC - 453	Microprocessor Lab	**0--0--2**	**-**	**20**	**20**	**30**	**50**	**1**
11.	**GP - 401**	**General Proficiency**				**50**		**50**	
Total			**18-2-8**					**800**	**24**

AS - 301
MATHEMATICS- III

L	T	P
3	1	0

Unit- I: Sequences and Series **08**

Sequences, Limit of a sequence, Convergence, Divergence and Oscillation of a sequence, Infinite series, Necessary condition for convergence, Standard infinite series, Geometric series and Harmonic series. Tests for convergence and divergence, Comparison test (only for series with positive terms), Cauchy's integral test, D'alembert's ratio test, Cauchy's nth root test, Raabe's test (higher ratio test), Logarithmic test, Demorgan's and Bertrand's tests, Alternating series Leibnitz's theorem (without proof), Absolute convergence and Conditional convergence, Power series.

Unit- II: Function of Complex variable **08**

Analytic function, C-R equations, Harmonic functions, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions, Taylor's and Laurent's series, Singularities, Zeroes and Poles, Residue theorem, Evaluation of real integrals of the type $\int_0^{2\pi} f(cos\theta,\ sin\theta)d\theta$ and $\int_{-\infty}^{+\infty} f(x)dx$.

Unit- III: Integral Transforms **08**

Fourier integral, Complex Fourier transform, Inverse transform, Convolution theorem, Fourier sine and cosine transform, Applications of Fourier transform to simple one dimensional heat transfer equations, wave equations and Laplace equations, Z- transform and its application to solve difference equations.

Unit- IV: Statistical Techniques – I **08**

Moments, Moment generating functions, Skewness, Kurtosis, Curve fitting, Method of least squares, Fitting of straight lines, Polynomials, Exponential curves etc., Correlation, Linear, non-linear and multiple regression analysis, Probability theory.

Unit- V: Statistical Techniques – II **08**

Binomial, Poisson and Normal distributions, Sampling theory (small and large), Tets of significations: Chi- square test, t-test, Analysis of variance (one way), Application to engineering, medicine, agriculture etc. Time series and forecasting (moving and semi- averages), Statistical quality control methods, Control charts, $\bar{X}$, R, p, np and c charts.

Test Books :-

1. Peter V. O'Neil, Advance Engineering Mathematics Thomson (Cengage) Learning, 2007.
2. J.N. Kanpur, Mathematical Statistics, S. Chand & company Ttd., 2000

Reference Books :-

1. R.K. Jain & S.R.K. Iyenger, Advance Engineering Mathematics, Narosa Publication House, 2002.
2. Chandika Prasad, Advanced Mathematics for Engineers, Prasad Mudralaya, 1996.
3. B. V. Ramana, Higher Engineering Mathematics, Mc Gra Hill Education, 2016.
4. E. Kreysig, Advanced Engineering Mathematics, John Wiley & Sons, 2005.
5. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2005.
6. S.P. Gupta, Statistical Methods, Sultan and Sons, New Delhi, 2004.
7. Devore, Probability and Statistics, Thomson (Cengage) Learning, 2007.
8. Walpole, Myers, Myers & Ye, Probability and Statistics for Engineers & Scientists, Pearson Education, 2003.

EE - 301

NETWORK ANALYSIS AND SYNTHESIS

L	T	P
3	1	0

UNIT I **05**

Graph Theory:- Graph of a Network, definitions, tree, co tree , link, basic loop and basic cut set, Incidence matrix, cut set matrix, Tie set matrix Duality, Loop and Nodal methods of analysis.

UNIT II **07**

Network Theorems (Applications to AC networks):-Concept of linearity, and homogeneity Principle, Super-position theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem, Reciprocity theorem. Millman's theorem, compensation theorem, Tellegen's theorem.

UNIT III **07**

Network Functions:-Concept of Complex frequency, Transform Impedances, Network functions of one port and two ports networks, concept of poles and zeros, properties of driving point and transfer functions, time response and stability from pole zero plot.

UNIT IV **09**

Two Port Networks:-Characterization of LTI two port networks ZY, ABCD and h parameters, reciprocity and symmetry. Inter-relationships between the parameters, inter-connections of two port networks, Ladder and Lattice networks. T & Π Representation, Concepts of multi-port networks and their practical examples.

UNIT V **12**

Network Synthesis:-Positive real function; definition, properties and limitations; properties of LC, RC and RL driving point functions, synthesis of LC, RC and RL driving point immittance functions using Foster and Cauer first and second forms, similarities and dissimilarities between Foster's and Cauer's forms.

Filters: Image parameters and characteristics impedance, passive and active filter fundamentals, low-pass, high-pass, (constant K type) filters, and introduction to active filters.

Text Books:-

1. A.Chakrabarti, "Circuit Theory" Dhanpat Rai & Co.
2. C.L Wadhwa, "Network Analysis and Synthesis" New Age International Publishers, 2007.
3. N.C. Jagan and C. Lakshminarayana, "Newwork Analysis" B.S. Publications, 2008.

Reference Books

1. D.Roy Choudhary, "Networks and Systems" Wiley Eastern Ltd.
2. M.E. Van Valkenburg, "Network Analysis", Prentice Hall of India
3. Donald E. Scott: "An Introduction to Circuit analysis: A System Approach" McGraw Hill
4 M.E. Van Valkenburg, "An Introduction to Modern Network Synthesis",Wiley Eastern Ltd.

CS - 301
DATA STRUCTURE PRIMER USING 'C'

L	T	P
3	0	0

Unit –I **07**

Introduction: Basic Terminology, Elementary Data Organization, Built in Data Types, Abstract Data Types.

Arrays: Single and Multidimensional Arrays, Representation of Arrays, Derivation of Index Formulae for 1D, 2D, 3D & nD Array Application of arrays, Sparse Matrices and their representations.

Linked lists: Implementation of Singly Linked List using Array, and Pointer, Doubly Linked List, Circularly Linked List, Operations on a Linked List: Insertion, Deletion, Traversal, Polynomial Representation.

Unit – II **08**

Stacks: Basic operations: Push & Pop, Array and Linked List Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Iteration and Recursion- Principles of recursion, Tail recursion, Removal of recursion Problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers, and Hanoi towers. Trade-offs between iteration and recursion.

Queues: Basic operations: Create, Add, Delete, Circular queues, Array and linked list implementation of queues in C, Dequeue and Priority Queue.

Unit – III **09**

Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array and Pointer (Linked List) Representation, Binary Search Tree, Strictly Binary Tree, Complete Binary Tree. Extended Binary Trees, Tree Traversal algorithms: In-order, Pre-order and Post-order, Constructing Binary Tree from given Tree Traversal, Insertion , Deletion, Searching & Modification of data in Binary Search. Threaded Binary trees, Traversing Threaded Binary trees. Huffman coding using Binary Tree. Concept & Basic Operations for AVL Tree, B Tree & Binary Heaps.

Unit – IV **08**

Searching: Sequential search, Index Sequential Search, Binary Search.

Hashing: Concept of Hashing & Collision resolution Techniques.

Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix Sort.

Unit – V **08**

Graphs: Basic terminology, Graph Representations: Adjacency Matrices, Adjacency List, Adjacency. Graph Traversal: Depth First Search and Breadth First Search, Connected Component, Spanning Trees, Minimum Cost Spanning Trees: Prims and Kruskal algorithm. Transitive Closure and Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm.

Text Books:

1. Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein "Data Structures Using C and C++" , PHI
2. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education
3. Thareja, "Data Structure Using C" Oxford Higher Education

Reference Books

1. Horowitz and Sahani, "Fundamentals of Data Structures", Galgotia Publication
2. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education
3. Lipschutz, "Data Structures" Schaum's Outline Series, TMH

CS - 302

NUMERICAL AND STATISTICAL TECHNIQUES IN COMPUTER SCIENCE

L	T	P
3	0	0

Unit-I: Introduction **08**

Numbers and their accuracy, Computer Arithmetic, Mathematical preliminaries, Errors and their Computation, General error formula, Error in a series approximation

Solution of Algebraic and Transcendental Equation:

Bisection Method, Iteration method, Method of false position, Newton-Raphson method, Methods of finding complex roots, Muller's method, Rate of convergence of Iterative methods, Polynomial Equations.

Unit-II: Interpolation **08**

Finite Differences, Difference tables Polynomial Interpolation**:** Newton's forward and backward formula Central Difference Formulae: Gauss forward and backward formula, Stirling's, Bessel's, Everett's formula.

Interpolation with unequal intervals: Langrange's Interpolation, Newton Divided difference formula, Hermite's Interpolation

Unit-III: Numerical Integration and Differentiation **08**

Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rule, Boole's rule, Waddle's rule.

Unit-IV: Solution of differential Equations **08**

Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta Methods, Predictor Corrector Methods, Automatic Error Monitoring and Stability of solution

Unit-V: Boundary Value problems **08**

Finte difference method, solving eigenvalue problems, polynomial method and power method. Numerical solution of Partial Differential equations. Elliptic, Parabolic and hyperbolic PDEs.

Text Books:

1. Jain, Iyengar and Jain, "Numerical Methods for Scientific and Engineering Computations", New Age Int
2. Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi

Reference Books

1. Rajaraman V, "Computer Oriented Numerical Methods", Pearson Education
2. Gerald & Whealey, "Applied Numerical Analyses", AW
3. T Veerarajan, T Ramachandran, "Theory and Problems in Numerical Methods, TMH
4. Pradip Niyogi, "Numerical Analysis and Algorithms", TMH
5. Francis Scheld, " Numerical Analysis", TMH
6. Sastry S. S, "Introductory Methods of Numerical Analysis", Pearson Education.
7. Gupta C.B., Vijay Gupta, "Introduction to Statistical Methods", Vikas Publishing.
8. Goyal, M, "Computer Based Numerical and Statistical Techniques", Firewall Media, New Delhi.
9. Jaan Kiusalaas, Numerical methods in engineering with MATLAB, Cambridge University Press
10. C. Woodford and C. Phillips, Numerical methods with worked examples: MATLAB Edition, Springer

EC-301

DIGITAL CIRCUITS & LOGIC DESIGN

L	T	P
3	0	0

Unit-I **09**

Digital system and binary numbers: Number System: Binary, Octal, Hexadecimal, Character Codes (BCD, ASCII, EBCDIC) and its arithmetic, Signed binary numbers, Cyclic codes, error detecting and correcting codes, Hamming Code.

Gate-level minimization: Boolean algebra: definition, axioms, basic theorems, and properties, Boolean functions, Canonical and standard forms, NAND and NOR implementation, K- map method up to five variable, don't care conditions, Quine Mc-Clusky method (tabular method).

Unit-II **07**

Combinational logic: Combinational circuits, analysis procedure, design procedure, binary adder-subtractor, decimal adder, magnitude comparator, decoders, encoders, multiplexers, Demultiplexers.

Unit-III **08**

Sequential logic: Sequential circuits, storage elements: latches, flip flops, analysis of clocked sequential circuits, state reduction and assignments, design procedure.

Registers and Counters: Shift registers, ripple counter, synchronous counter, other counters: Johnson & Ring Counter.

Unit-IV **08**

Synchronous and Asynchronous Sequential Circuits: Analysis of clocked sequential circuits with state machine designing, State reduction & assignments, Design procedure. Analysis procedure of Asynchronous sequential circuits, circuit with latches, design procedure, Reduction of state and flow table, Race-free state assignment.

Unit-V **08**

Memory and programmable logic: Introduction to Digital Logic families, RAM, ROM, PLA, PAL, Introduction to VHDL, Basics, Design of Combinational and Sequential circuits using VHDL.

Text Books:

1. M. Morris Mano and M. D. Ciletti, "Digital Design", Pearson Education.
2. David J. Comer, "Digital Logic & State Machine Design", Oxford University Press
3. RP Jain, "Modern Digital Electronics", Tata McGraw Hill Publication.
4. Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6thEdition, TMH, 2003.

Reference Books:

1. DP Kothari and J.S. Dhillon, "Digital Circuits and Design", Pearson Education
2. A. Anand Kumar, "Fundamentals of Digital Circuits", PHI Learning Pvt. Ltd.
3. Douglas L. Perry, "VHDL: Programming by Example", McGraw-Hill
4. Jairam Bhaskar, "A VHDL Primer", Prentice Hall PTR

AS – 302/402

HUMAN VALUES AND ETHICS

L	T	P
3	0	0

UNIT 1 **08**

Course Introduction

1. Understanding: Why humans are ethical, why they are not;
2. Understanding the need, basic guidelines, content and process for Value Education;
3. Self Exploration–what is it? – It's content and process;
4. 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration;
5. Right understanding of Relationship and Physical Facilities- the basic requirements for fulfilment of aspirations of every human being with their correct priority;
6. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario;
7. Method to fulfil the above human aspirations: understanding and living in **harmony** at various levels

UNIT 2 **08**

Understanding of Human Values and Ethics

1. Understanding the needs of Self ('I') and Body ('Me');
2. Understanding values in human-human relationship;
3. Meaning of Co-existence and Mutual Satisfaction;
4. Understanding Respect;
5. Understanding Comprehensive Human Goals;

UNIT 3 **08**

Effects of Holistic Harmony on Professional Ethics

1. World as a Nation;
2. Definitiveness of Ethical Human Conduct;
3. Basis for Humanistic Education and Humanistic Universal Order;
4. Competence in professional ethics:
    a) Ability to utilize the professional competence for augmenting universal human order;
    b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,;
    c) Ability to identify and develop appropriate technologies and management patterns for above production system;
5. Strategy for transition from the present state to Universal Human Order:
    a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers;
    b) At the level of society: as mutually enriching institutions and organizations;

UNIT 4 **08**

Effects of Holistic Personality for Success

1. Negotiation as a tool for success;
2. Leadership as an attribute of a successful Professional;
3. Managing Stress and Time;
4. Team Building--creating a harmonious environment with apathy to each other;
5. Understanding difference between evolution and revolution;

UNIT 5 **08**

Managing Relationship for Success

1. Understanding and valuing Cross-Cultural Ethics;
2. Managing Relationships (Networking), Personal Effectiveness and Self Leadership;
3. Theory of Constraints;
4. A Decision Making Model: Ethics as making decisions and choices;
5. Conflicts and Ethical Dilemmas;
6. Entrepreneurship and Ethics: A sense of business Ethics;
7. Pragmatic Behaviour of Business to its Colleagues/Competitors

Text Books:

1. Kazuo Ishiguro, 1989, *The Remains of the Day*, Faber and Faber
2. Sussan George, 1976, *How the Other Half Dies*. Penguin Press, Reprint 1991;
3. Amitabh Ghosh, 2008, *Sea of Poppies*. John Murray Publications.

Reference Books

1. B. L. Bajpai, 2004, *Indian Ethos and Modern Management*. New Royal Book Co., Lucknow. Reprinted 2008;
2. R. K. Narayan, 1958, *The Guide*, Viking Press.
3. P. L. Dhar, R. R. Gour, 1990, *Science and Humanism*, Commonwealth Publishers;
4. R. R. Gaur, R. Sangal and G. P. Bagaria, 2010, *A Foundation Course in Human Values and Professional Ethics*, Excel Books.

Relevant movies and documentaries:

1. Story of Stuff (Documentary);
2. The Remains of the Day (Movie);
3. Pursuit of Happyness (Movie);
4. Fences (Movie);
5. Gifted (Movie)

AS – 303/ AS - 403
ENVIRONMENT AND ECOLOGY

L	T	P
3	0	0

Unit I- Fundamentals of Environment & Ecology **08**

Definition, Scope & Importance and Need for public awareness.

Ecosystem- Definition, Energy flow in ecosystem, Ecological succession and Balanced ecosystem.

Effect of human activities on food, Shelter, Economic and social security.

Effect of human activities on environment - Agriculture, Housing, Industry, Mining and Transportation activities.

Basics of Environmental Impact, Assessment and Sustainable development.

Unit II- Natural Resources & Environmental Quality standard **09**

Water resources- Availability and quality aspects. Mineral resources, Material Cycle- Carbon, Nitrogen & Sulphur cycles, DO, BOD and COD.

Modern techniques used in analysis of Pollutants- Determination of disinfectants, Pesticides, Ambient Quality standards, Water quality parameters and standards, Turbidity, pH, Suspended solids and hardness,

Unit III- Environmental Pollution & Current Environmental issues **09**

Environmental Pollution-Definition, Causes, Effects and control measure of:

1. Air Pollution
2. Water Pollution
3. Soil pollution
4. Marine Pollution

Current environmental issues of importance: Population growth, Climate change & Global warming- effects, Urbanization, Cause of global warming, Acid rain. Ozone layer depletion- causes and effects on health, Control measures. Photochemical smog, Solid waste management, Waste water treatment.

Unit IV- Energy-Types , Sources and Uses **08**

Different types of energy, Conventional and nonconventional sources- Hydro-electric, Fossil fuel based, Nuclear, Solar, Biomass, Geothermal energy and Biogas. Hydrogen as alternative future source of energy.

Unit V- Environmental protection **06**

Role of Government, Legal aspects, Environment protection Act, Introduction to ISO 14000, Green building concept.

Text Book-

1. Environmental Studies- Dr. D. L. Manjunath, Pearson Education
2. Text book of Environment Science and Engineering- M. Anji Reddy- B S Publication
3. Elements of Environmental Science and Engineering- Dr. P. Meenakshi- Prentice-Hall of India Pvt Ltd, New Delhi, 2008.
4. Environment and Ecology- P.D. Sharma- Rastogi publication 2009.

Reference Books-

1. Principle of Environmental Science and Engineering- P. Venugopalan Rao, Prentice Hall of India.
2. Environmental studies- R. Rajagopalan- Oxford Publication-2005.

EE - 351
NETWORKS ANALYSIS AND SYNTHESIS LAB

L	T	P
0	0	2

LIST OF EXPERIMENTS

Note :- At least ten experiments are to be conducted from the following list.

1. Verification of principle of superposition theorem with AC source.
2. Verification of Thevenin's and Norton's theorem with AC source.
3. Verification of Maximum power transfer theorem in AC circuits.
4. Verification of Tellegen's theorem for two networks of the same topology.
5. Determination of transient response of current in RL and RC circuits with step voltage input.
6. Determination of transient response of current in RLC circuit with step voltage input for under damped, critically damped and over damped cases.
7. Determination of frequency response of current in RLC circuit with sinusoidal AC input.
8. Determination of z and h parameters for a two-port network and compute other parameters.
9. Determination of driving point and transfer functions of a two port ladder network and verify with theoretical values.
10. Determination of image impedance and characteristic impedance of T and Π networks, using O.C. and S.C. tests.
11. Verification of parameter properties in inter-connected two port networks: series, parallel and cascaded.
12. Determination of frequency response of a Twin – T notch filter.
13. To determine attenuation characteristics of a low pass / high pass active filters

CS-351
DATA STRUCTURE LAB
LIST OF EXPERIMENTS

L	T	P
0	0	2

Note :- At least ten experiments are to be conducted from the following list.

1. To implement addition and multiplication of two 2D arrays.

2. To transpose a 2D array.

3. To implement stack using array.

4. To implement stack using linked list.

5. To implement queue using array.

6. To implement queue using linked list.

7. To implement circular queue using array.

8. To implement circular queue using linked list.

9. To implement binary tree using linked list.

10. To implement binary search tree using linked list.

11. To implement tree traversals using linked list.

12. To implement BFS using linked list.

13. To implement DFS using linked list.

14. To implement Linear Search.

15. To implement Binary Search.

16. To implement Bubble Sorting.

17. To implement Selection Sorting.

18. To implement Insertion Sorting.

19. To implement Merge Sorting.

20. To implement Heap Sorting.

CS-352
NUMERICAL TECHNIQUES LAB

L	T	P
0	0	2

Note :- At least ten experiments are to be conducted from section 'B'.

A Introduction to MATLAB:

1. Data types and variables
2. Operators
3. Flow control
4. Functions
5. Input / Output
6. Vectors and Matrices
7. M-File

B Implementation of Programs in MATLAB:

1. WAP to print sum of even and odd numbers from 1 to N numbers.
2. WAP to find the sum of digits of the entered number.
3. WAP to find the eigen values and eigenvectors of a given square matrix.
4. WAP to find the root of the Algebraic equations using Bisection Method.
5. WAP to findthe root of the Algebraic equations using Regula - falsi Method.
6. WAP to find the root of the Algebraic equations using Newton Raphson Method.
7. WAP to implement Newton's Forward Interpolation formula.
8. WAP to implement Newton's Divided Difference Interpolation formula.
9. WAP to implement Langranges Interpolation formula.
10. WAP to implement Numerical Integration using Trapezoidal rule.
11. WAP to implement Numerical Integration using Simpson 1/3 rule.
12. WAP to implement Numerical Integration using Simpson 3/8 rule.
13. WAP to implement Numerical Differentiations.

EC-351
DIGITAL CIRCUITS & LOGIC DESIGN LAB
LIST OF EXPERIMENTS

L	T	P
0	0	2

Note:- Minimum ten experiments are to be performed from the following list.

1. Nomenclature of digital ICs, specifications, study of the data sheet, Concept of Vcc and ground, verification of the truth tables of logic gates using TTL ICs.
2. Realization of basic gates using Universal logic gates.
3. To implement BCD to Excess-3 & vice-versa.
4. To implement 4-bit parity generator & comparator circuits.
5. Construction of simple Decoder & Multiplexer circuits using logic gates.
6. Design of combinational circuit for BCD to decimal conversion to drive 7-segment display using multiplexer
7. To implement Adder and Subtractor.
8. Realization of RS-JK & D flip-flops using Universal logic gates.
9. Realization of Universal Register using JK flip-flops & logic gates.
10. Realization of Universal Register using multiplexer & flip-flops.
11. Construction of Adder circuit using Shift Register & full Adder.
12. Realization of Asynchronous Up/Down counter.
13. Realization of Synchronous Up/Down counter.
14. Implementation of Mini Project using digital integrated circuits and other components.

AS - 404

DISCRETE MATHEMATICAL STRUCTURE

L	T	P
3	1	0

UNIT I **08**

Set Theory: Introduction, Combination of sets, Multi sets, ordered pairs, Set identities.

Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Order of relations.

Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions.

UNIT II **09**

Propositional Logic: Proposition, Logical connectives, Truth tables, Well formed formula, Tautology, Contradiction, Algebra of proposition, Normal forms, Modus ponens, Modus tollens,Validity.

Predicate Logic: First order predicate, Well formed formula of predicate, Quantifiers, Inference theory of predicate logic.

Notion of Proof: Proof by implication, converse, inverse, contra-positive, Negation and contradiction, Direct proof, Proof by using truth table, Proof by counter example.

UNIT- III **09**

Combinatories: Mathematical induction, Basics of counting, Pigeonhole principle, Permutations, Combinations, Inclusion-exclusion.

Recurrence Relations & Generating function: Recurrence relation of order n with constant coefficients, Homogeneous recurrence relations, Inhomogeneous recurrence relation, Generating function Closed form expression, Properties of G.F., Solution of recurrence relation using G.F., Solution of combinatorial problem using G.F.

UNIT IV **08**

Algebraic Structures: Binary composition and its properties, Definition of algebraic structure, Semi group, Monoid, Group, Abelain group, Properties of groups, Permutation group, Sub group, Cyclic group, Rings and Fields(definition and standard results), and Integers modulo n.

UNIT V **06**

Elements of coding theory: Introduction, Definitions, Error detecting & correcting code, Harmonic Code and distance, Theorems.

Group (Linear) Codes, Decoding methods. Parity check and Generator matrix, Definition parity check Matrix decoding, Coset decoding

Hamming's Codes: Concept, implementation as error correcting code, single error correcting (SEC) Code and single error correcting & double error detection code (SEC- DED).

Text Books:

1. Liu and Mohapatra, " Elements of Discrete Mathematics", McGraw Hill
2. Y.N. Singh, "Discrete Mathematical Structures", Wiley India, New Delhi, 2010.
3. R.P. Grimaldi, Discrete and Combinatorial Mathematics, Addison Welsy,
4. S.K. Sarkar, "A Text Book of Discrete Mathematics", S.Chand & Company Ltd., 2012.

Reference Books

1. Kenneth H. Rosen, " Discerete Mathematics and its Applications", Mc Graw Hill, 2002.
2 J.P. Tremblay & R. Manohar, " Discrete Mathematical Structure with Applications to Computer Science" Mc Graw Hill, 1975.
3. V. Krishnamurthy, "Combinatories: Theory and Apllications", East-West Press.
4. Seymour Lipschutz, M.Lipson, "Discrete Mathematics" Tata Mc Graw Hill, 2005.
5. Kolman, Busby Ross, "Discrete Mathematical Structures", Prentice Hall Internatinal.

CS-401

COMPUTER ORGANIZATION

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Unit-I **08**

Introduction: Functional units of digital system and their interconnections, buses, bus architecture, types of buses and bus arbitration. Register, bus and memory transfer. Processor organization, general register organization, stack organization and addressing modes.

Unit-II **09**

Arithmetic and logic unit: Fixed and floating point representation, IEEE standard for floating point representation, Signed Adder, Subtracter circuits. Look ahead carry adders. Multiplication: Signed operand multiplication, Booth's algorithm and array multiplier. Division and logic operations. Floating point arithmetic operation, Arithmetic & logic unit design

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Unit-III **08**

Control Unit: Instruction types, formats, instruction cycles and sub-cycles (fetch and execute etc) , micro-operations, execution of a complete instruction. Hardwire and microprogrammed control: microprogramme sequencing, concept of horizontal and vertical microprogramming.

Unit-IV **08**

Memory: Basic concept and hierarchy, semiconductor RAM memories, 2D & 2 1/2D memory organization. ROM memories. Cache memories: concept and design issues & performance, address mapping and replacement. Auxiliary memories: magnetic disk, magnetic tape and optical disks. Virtual memory: concept implementation.

Unit-V **07**

Input / Output: Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts and exceptions. Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access., I/O channels and processors. Serial Communication: Synchronous & asynchronous communication, standard communication interfaces.

Text Books:

1. William Stalling, " Computer Organization", PHI
2. Vravice,Hamacher & Zaky, "Computer Organization", TMH
3. Mano," Computer System Architecture", PHI

Reference Books

1. Patterson, Computer Organisation and Design, Elsevier Pub. 2009
2. John P Hays, " Computer Organization", McGraw Hill
3. Tannenbaum," Structured Computer Organization', PHI
4. P Pal chaudhry, ' Computer Organization & Design', PHI

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THEORY OF AUTOMATA

L	T	P
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Unit-I **09**

Automata Theory: Introduction to Theory of Computation- Automata, Computability and Complexity, Alphabet, Symbol, String, Formal Languages, Deterministic Finite Automaton (DFA)-Definition, Representation, Acceptability of a String and Language, Non-Deterministic Finite Automaton (NFA), Equivalence of DFA and NFA, NFA with ε-Transition, Equivalence of NFA's with and without ε-Transition, Finite Automata with output- Moore Machine, Mealy Machine, Equivalence of Moore and Mealy Machine, Minimization of Finite Automata.

Unit-II **07**

Regular Expressions: Regular Expressions, Transition Graph, Kleen's Theorem, Finite Automata and Regular Expression- Arden's theorem.

Regular and Non-Regular Languages: Closure properties of Regular Languages, Pigeonhole Principle, Pumping Lemma, Application of Pumping Lemma, Decidability- Decision properties.

Unit-III **07**

Regular and Non-Regular Grammars: Context Free Grammar(CFG)-Definition, Derivations, Languages, Derivation Trees and Ambiguity, Regular Grammars-Right Linear and Left Linear grammars, Conversion of FA into CFG and Regular grammar into FA, Simplification of CFG, Normal Forms- Chomsky Normal Form(CNF), Greibach Normal Form (GNF), Chomsky Hierarchy.

Unit-IV **08**

Push Down Automata: Description and definition, Language of PDA, Acceptance by Final state, Acceptance by empty stack, DeterministicPDA, Equivalence of PDA and CFG, Two stack PDA.

Context Free Languages: Definition, Examples, and properties of CFL: Closure properties of CFLs,Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.

Unit-V **09**

Turing Machines: Basic Turing Machine Model, Representation of Turing Machines, Language Acceptability of Turing Machines, Techniques for Turing Machine Construction, Modifications of Turing Machine, Universal Turing machine, Linear Bounded Automata, Church's Thesis.

Recursive Function Theory: Recursive and Recursively Enumerable language, Halting Problem, Post's Correspondence Problem, Introduction to Recursive Function Theory.

Text Books:

1. Introduction to Automata theory, Languages and Computation, J.E.Hopcraft, R.Motwani, and Ullman. 2nd edition, Pearson Education Asia
2. Introduction to languages and the theory of computation, J Martin, 3rd Edition, Tata McGraw Hill
3. Elements and Theory of Computation, C Papadimitrou and C. L. Lewis, PHI

Reference Books

1. Mathematical Foundation of Computer Science, Y.N.Singh, New Age International
2. KLP Mishra and N. Chandrasekaran, "Theory of Computer Science: Automata,Languages and Computation", PHI Learning Private Limited, Delhi India.
3. Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishinghouse.
4. K. Krithivasan and R. Rama; Introduction to Formal Languages, Automata Theory and Computation; Pearson Education.

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OBJECT ORIENTED PROGRAMMING

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Unit-I **09**

Basic concepts of Object-Oriented Programming: Objects and classes, identifying object relationships, attributes and methods, links and association, generalization and inheritance, aggregation, abstract class, multiple inheritance, meta data, candidate keys, constraints, Interfaces, Types and Roles, Packages. Data flow diagram, specifying operations, constraints, a sample functional model, OMT (object modeling techniques) methodologies, examples and case studies to demonstrate methodologies.

Unit-II **08**

Java Programming Language: Introduction to Java Programming, Operator, Data type, Variable, Arrays, Control Statements, Methods & Classes, Package and Interface, Polymorphism, Inheritance, Exception Handling, Multithread programming, Input / Output: exploring Java.io, Java Applet, String handling, Networking, Event handling.

Introduction to AWT: AWT Controls, Graphics, Layout Manager and Menus, Images, Additional packages.

Unit-III **08**

Java Swing: Creating a Swing Applet and Application, Programming using Panes, Pluggable Look and feel,

Labels, Text fields, Buttons, Toggle buttons, Checkboxes, Radio Buttons, View ports, Scroll Panes, Scroll Bars, Lists, Combo box, Progress Bar, Menus and Toolbars, Layered Panes, Tabbed Panes, Split Panes, Layouts, Windows, Dialog Boxes.

JDBC: The connectivity Model, JDBC/ODBC Bridge, java.sql package, connectivity to remote database.

Unit-IV **08**

Java Beans: Application Builder tools, The bean developer kit(BDK), JAR files, Introspection, Developing asimple bean, using Bound properties, The Java Beans API, Session Beans, Entity Beans, Introduction to Enterprise Java beans (EJB).

Unit-V **07**

Java Servlets: Servlet basics, Servlet API basic, Life cycle of a Servlet, Running Servlet, Debugging Servlets, Thread-safe Servlets, HTTP Redirects, Cookies, Introduction to Java Server pages (JSP).

Text Books:

1. James Rumbaugh etal, “Object Oriented Modeling and Design”, PHI
2. Balagurusamy E, “Programming in JAVA”, Tata Mcgraw-hill Education Pvt. Ltd.
3. Herbert Schicldt, “The Complete Reference: Java” TMH

Reference Books

1. Dustin R. Callway, “Inside Servlets”, Addison Wesley.
2. Mark Wutica, “Java Enterprise Edition”, QUE.
3. Steven Holzner, “Java2 Black book”, Wiley Dreamtech Publication.
4. Liang, “Introduction to Java Programming, Comprehensive Version”, Pearson Education.
5. Deitel and Deitel, “Java: How to Program” PHI Learning Private Limited, Delhi India.
6. Thampi, “Object Oriented Programming in JAVA” Wiley Dreamtech Publication

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FUNDAMENTALS OF MICROPROCESSOR

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Unit-I **08**

Introduction to Microprocessor: Microprocessor evolution and types, microprocessor architecture and its operation, addressing modes, interrupts, data transfer schemes, instruction and data flow, timer and timing diagram, Basic interfacing concepts, Memory interfacing, Interfacing output displays, Interfacing input devices.

Unit-II **09**

Introduction to 8085 microprocessor: Pin diagram and internal architecture of 8085 microprocessor, registers, ALU, Control & status, interrupt and machine cycle. Instruction sets. Instruction formats. Instruction Classification: data transfer, arithmetic, logic, branch operations, looping, counting, indexing, programming techniques, counters and time delays, stacks and subroutines, conditional call and return instructions.

Unit-III **08**

Introduction to 8086 microprocessor: Architecture of 8086 microprocessor, pin diagram, Functional block diagram, register organization, bus interface unit, execution unit, memory addressing, and memory segmentation. Operating modes, Instruction sets, instruction format, Types of instructions. Interrupts: hardware and software interrupts.

Unit-IV **08**

Introduction to Assembly Language: Assembly language programming based on intel 8085/8086. Instructions, data transfer, arithmetic, logic, branch operations, looping, counting, indexing, programming techniques, counters and time delays, stacks and subroutines, conditional call and return instructions.

Unit-V **07**

Peripheral Devices: 8237 DMA Controller, 8255 programmable peripheral interface, 8253/8254 programmable timer/counter, 8259 programmable interrupt controller, 8251 USART and RS232C.

Text Books:

1. Gaonkar, Ramesh S , "Microprocessor Architecture, Programming and Applications with8085", Penram International Publishing.
2. Hall D V ,"Microprocessor Interfacing', TMH
3. Liu Y.C. & Gibson G.A. , " Microcomputer System: The 8086/8088 family'', Pearson Education

Reference Books

1. Aditya P Mathur Sigh, "Microprocessor, Interfacing and Applications M Rafiqzzaman, "Microprocessors, Theory and Applications
2. Ray A K , Bhurchandi K M , "Advanced Microprocessors and Peripherals", TMH
3. Brey, Barry B, "INTEL Microprocessors", PHI

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COMPUTER ORGANIZATION LAB

LIST OF EXPERIMENTS

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Note:- Minimum ten experiments are to be performed from the following list.

1. To design and examine the operations of Half Adder and Full Adder
2. To design and examine the operations of 8 Bit ripple carry adder.
3. To design and examine the operation of 4 bit look ahead carry adder.
4. To design and examine the operations of Counters.
5. To design and examine the operations of Registers.
6. To design and examine the operations of Arithmetic Logic Unit (ALU)
7. To design and examine the operations of RAM
8. To study chips, ports, and slots of Motherboard.
9. To study internal architecture and function of Hard Disk Drive.
10. To study internal architecture and function of keyboard.
11. To study dismantling and assembling of PC

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AUTOMATA LAB

L	T	P
0	0	2

LIST OF EXPERIMENTS

Note:- Minimum ten experiments are to be performed from the following list.

1. To implement Deterministic Finite Automata
2. To implement Nondeterministic Finite Automata
3. To implement Conversion of NFA to DFA
4. To implement DFA Minimization
5. To implement DFA to regular grammar conversion
6. To implement DFA to regular expression conversion
7. To implement Combining of automata
8. To implement Regular expression to DFA conversion
9. To implement Mealy and Moore machine
10. To implement Pushdown automata
11. To implement Single tape Turing machine
12. To implement Multi-tape Turing machine
13. To implement Context free grammars (CFG) with single symbols
14. To implement CFG with multiple symbols
15. To implement LL Parsing
16. To implement LR Parsing
17. To implement Regular expressions
18. To implement Regular pumping lemma
19. To implement Context free pumping lemma
20. To implement CFG to Chomsky Normal form transformation

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OBJECT ORIENTED PROGRAMMING / JAVA LAB

L	T	P
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LIST OF EXPERIMENTS

Note:- Minimum ten experiments are to be performed from the following list.

1. Write a program to display a table in the format nx i = m.
2. WAP that checks whether the two numbers entered by the user are equal or not.
3. WAP to find the greatest of three numbers.
4. WAP that swaps values of two variables with and without using a third variable.
5. WAP using switch case statement to identify the day of the week.
6. WAP to find the sum of digits of the entered number.
7. WAP to find the reverse of a number.
8. WAP to convert decimal number into binary number.
9. WAP to convert binary number into decimal number.
10. WAP to sort an array and search an element inside it.
11. WAP to search the minimum and the maximum element in an array.
12. WAP to check if two arrays are equal or not.
13. Create a class with two methods for calculating area & parameter of a triangle.
14. WAP in Java for illustrating overloading.
15. WAP in Java for illustrating over riding.
16. WAP in Java for illustrating various forms of Inheritance.
17. Write programs to create packages.
18. Write programs to create multiple threads in Java.
19. Write programs in Java for event handling Mouse and Keyboard events.
20. Using Layout Manager create different applications.
21. Write programs in Java to create and manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using swing/AWT.
22. Using Java create Applets.

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MICROPROCESSOR LAB

L	T	P
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LIST OF EXPERIMENTS

Note:- Minimum ten experiments are to be performed from the following list.

Case studies

1. To study 8085 based microprocessor system
2. To study 8086 and 8086A based microprocessor system
3. To study Pentium Processor

Programming based Experiments (any four)

4. To develop and run a program for finding out the largest/smallest number from a given set of numbers.
5. To develop and run a program for arranging in ascending/descending order of a set of numbers
6. To perform multiplication/division of given numbers
7. To perform conversion of temperature from 0F to 0C and vice-versa
8. To perform computation of square root of a given number
9. To perform floating point mathematical operations (addition, subtraction, multiplication and division)

Interfacing based Experiments (any four)

10. To obtain interfacing of RAM chip to 8085/8086 based system
11. To obtain interfacing of keyboard controller
12. To obtain interfacing of DMA controller
13. To obtain interfacing of PPI
14. To obtain interfacing of UART/USART
15. To perform microprocessor based stepper motor operation through 8085 kit
16. To perform microprocessor based traffic light control
17. To perform microprocessor based temperature control of hot water.